

## REMARKS

Claims 1 through 25 were presented for examination. Claims 17 through 25 have been withdrawn pursuant to the Applicants' election of claims 1 through 16 in response to the restriction requirement. Claim 1 has been amended to include language to specify that the heat exchanger must be positioned in the gas phase in the reactor.

The Examiner has rejected claims 1-7 and 13-16 under Section 103(a) as being unpatentable over Gibson et al. (WO 00/15646) which is said to disclose a process of polymerization of ethylene in a reactor containing an iron complex catalyst and methyl aluminoxane as a cocatalyst, a liquid phase, and a gas phase of which is heat exchanged. Claims 8 through 12 have been rejected over Gibson et al. in view of Devore et al. (U.S. 6,825,297) which is said to disclose Lewis acid compounds as cocatalysts which includes the specifically claimed cocatalyst  $ZnR_2$ . The Examiner's rejections are respectfully traversed.

The claimed invention herein is a process for making a linear alpha olefin oligomer in a reactor which must have both a liquid and a gas phase. The process comprises the steps of oligomerizing ethylene in the presence of a catalyst complex which is an iron complex of a 2,6-bis(arylmino) pyridine derivative to an alpha olefin oligomer in a reaction which involves the release of heat. The heat is removed with a heat exchanger which is not in direct contact with the liquid phase but is positioned in the gas phase and uses at least part of the gas phase as a coolant medium. A liquid reaction medium is required in the present invention because most or all of the reaction takes place in this medium (see page 5, line 17 of the specification). Some reaction may take place in the gas phase but the primary reaction medium is a liquid reaction medium.

It is important that the cooling system have its cooling element outside the liquid reaction medium to avoid the deposit of wax and polyethylene on the heat exchanger.

The Examiner's statement that Gibson describes polymerization in a reactor with a liquid phase and a gas phase is incorrect because Gibson describes only four types of reaction processes for producing ethylene polymers. These are described at page 9, lines 17 and 18, as solution phase, slurry phase, gas phase, or bulk phase. Solution phase polymerization is carried out exactly as is implied, i.e., in solution. Slurry phase polymerization is carried out exactly as is implied, i.e., in a slurry. Gas phase polymerization is carried out exactly as is implied, i.e., in the gas phase. There is nothing in the Gibson reference which suggests or implies that the reaction take place in a reactor which has both a discrete liquid phase where most of the reaction takes

place and also a discrete gas phase from which unreacted reaction components and some reaction products can be condensed.

Furthermore, the only specific descriptions of polymerization processes given in Gibson are of slurry and gas phase processes (see page 10, line 26, through page 12, line 7, of Gibson for the description of the slurry process). On page 12, lines 8 and 9, it is stated that in the bulk polymerization process, liquid monomer is used as the polymerization medium so again, this is an entirely liquid phase reaction.

Up to this point in Gibson, there is no description or discussion of heat exchange. The only discussion of heat exchange in the description is in the discussion of gas phase polymerization which begins at page 12, line 10. Earlier in the prosecution, the Examiner stated that a gas phase reaction must contain liquid. That is incorrect and is entirely inconsistent with the description of the gas phase process in Gibson. At page 12, lines 18-25, the reference defines the gas phase process as the formation of a solid in the polymerization zone directly from a gas and free from liquid. There is no liquid phase reaction medium and no condensation of a gas phase.

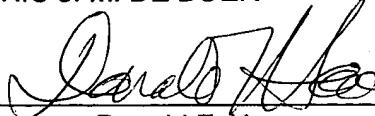
Turning to the rejection of claims 8-12, the Applicants assert that the Examiner has incorrectly characterized the disclosure of Devore. Devore describes at column 5, lines 20-50, a catalyst compound which contains a catalyst which can be a bisarylimino pyridine iron catalyst. The catalyst system may also contain an activating cocatalyst. At column 5, lines 36-38, it is stated that the activating cocatalyst can be "mixtures of such (polymeric or oligomeric) alumoxanes with one or more C<sub>1-20</sub> hydrocarbyl substituted Group 13 metal Lewis acid compounds, and mixtures of such alumoxanes or alumoxane/Lewis acid mixtures with one or more aliphatic or aromatic ethers." No zinc compound is mentioned in this description of the cocatalyst nor is any zinc compound mentioned at all anywhere in the patent. Zinc is a Group 12 element. Group 13 elements include boron and aluminum which are specifically mentioned lower down at column 5, lines 40-50. Thus, zinc compounds cannot even be implied by Devore.

The Applicants assert that the Section 103 rejections have been overcome by the above argument. Gibson does not disclose a process of the type claimed herein, i.e., one where there is a distinct liquid phase and a distinct gas phase and wherein most of the reaction takes place in the liquid phase and cooling is provided by a heat exchanger which is positioned in the gas phase. Devore simply does not disclose the zinc cocatalyst compounds of the present invention nor are they included in any generic description provided in the reference since the generic description of Lewis acids in the reference is limited to Group 13 metal Lewis acid compounds. For these

reasons, the Applicants assert that the rejection has been overcome and respectfully request an early notice of allowance.

Respectfully submitted,

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